

Claims

1. A mobile communication system that includes a mobile station and a mobile communication network to which this mobile station can connect by radio-waves, and that includes a compressed mode, which is a mode of intermittent communication having gaps in which communication is not carried out in mobile communication between said mobile station and said mobile communication network; said mobile communication network comprising:
 - 5 transmission means for, at a time of inter-frequency HO (Hand Over), using said gaps to transmit to said mobile station by an HO destination frequency, data that are identical to data that are transmitted from said mobile communication network to said mobile station by an HO origin frequency.
- 10 2. A mobile communication system according to claim 1, said mobile station comprising combining means for receiving and combining mutually identical data that are transmitted from said transmission means by the HO origin frequency and the HO destination frequency.
- 5 3. A mobile communication system according to claim 2, said mobile station comprising measurement means for measuring reception quality based on output data of said combining means and, based on this reception quality, implements variable control over a target reception quality that is used to control a transmission power of downlink between said mobile communication network and said mobile station.
4. A mobile communication system according to claim 1, said mobile

station comprising transmission means for, at the time of said inter-frequency HO, using said gaps to transmit, to said mobile communication network by the HO destination frequency, data that are identical to data transmitted from said
5 mobile station to said mobile communication network by the HO origin frequency.

5. A mobile communication system according to claim 4, wherein each of a plurality of base transceiver stations that make up said mobile communication network includes combining means for, when an HO origin base transceiver station and an HO destination base transceiver station at the time of
5 said inter-frequency HO are the same base transceiver station and this base transceiver station is its own base transceiver station, receiving and combining mutually identical data that are transmitted by the HO origin frequency and the HO destination frequency by said transmission means of said mobile station.

6. A mobile communication system according to claim 5, wherein each of said plurality of base transceiver stations includes measurement means for measuring reception quality based on output data of its own said combining means, and based on this reception quality, implements variable control over a
5 target reception quality that is used to control a transmission power of uplink between said mobile communication network and said mobile station.

7. A mobile communication system according to claim 4, wherein a Radio Network Controller that is connected to a plurality of base transceiver stations that make up said mobile communication network includes selective combining means for, when the HO origin base transceiver station and the HO
5 destination base transceiver station at the time of said inter-frequency HO are

different base transceiver stations, receiving by way of said HO origin base transceiver station and said HO destination base transceiver station mutually identical data that are transmitted by the HO origin frequency and the HO destination frequency by means of said transmission means of said mobile 10 station and selectively combining said received data.

8. A mobile communication system according to claim 7, wherein uplink transmission power control is effected by increasing the transmission power of the uplink between said mobile station and, of said HO origin base transceiver station and said HO destination base transceiver station, the base 5 transceiver station whose data have been selected more times in the selective combining that has been effected by said selective combining means within a past prescribed interval, and by decreasing the transmission power of the uplink between said mobile station and the base transceiver station whose data have been selected fewer times.

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9. A mobile communication system according to claim 4, wherein: said mobile station includes monitor means for monitoring, in said gaps, a common pilot signal that is a reference signal that is constantly transmitted by the HO destination base transceiver station at the time of 5 said inter-frequency HO; and said transmission means of each of said mobile communication network and said mobile station begins transmission of identical data after the monitoring of the common pilot signal by said monitor means is completed.

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10. A mobile communication system according to claim 3, wherein

said reception quality is reception SIR (Signal-to-Interference Ratio), and said target reception quality is target SIR.

11. A mobile communication system according to claim 6, wherein said reception quality is reception SIR (Signal-to-Interference Ratio), and said target reception quality is target SIR.

12. An inter-frequency HO (Hand Over) method of a mobile communication system that includes a mobile station and a mobile communication network to which this mobile station can connect by radio-waves, and that includes a compressed mode, which is a mode of intermittent communication having gaps in which communication is not carried out in mobile communication between said mobile station and said mobile communication network; said inter-frequency HO method comprising:

10 a transmission step wherein said mobile communication network, at a time of inter-frequency HO, uses said gaps to transmit to said mobile station by an HO destination frequency, data that are identical to data that are transmitted from said mobile communication network to said mobile station by an HO origin frequency.

13. An inter-frequency HO method according to claim 12, said method comprising a combining step wherein said mobile station receives and combines mutually identical data that are transmitted by the HO origin frequency and the HO destination frequency in said transmission step.

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14. An inter-frequency HO method according to claim 13, said method comprising a measurement step wherein said mobile station measures

reception quality based on combined data obtained by said combining step; wherein, based on this reception quality, variable control is implemented over
5 target reception quality that is used to control the transmission power of downlink between said mobile communication network and said mobile station.

15. An inter-frequency HO method according to claim 12, said method comprising a transmission step wherein said mobile station, at the time of said inter-frequency HO, uses said gaps to transmit, to said mobile communication network by the HO destination frequency, data that are identical to data that are
5 transmitted from said mobile station to said mobile communication network by the HO origin frequency.

16. An inter-frequency HO method according to claim 15, said method comprising a combining step whereby each of a plurality of base transceiver stations that make up said mobile communication network, when an HO origin base transceiver station and an HO destination base transceiver station at the
5 time of said inter-frequency HO are the same base transceiver station and this base transceiver station is its own base transceiver station, receive and combine mutually identical data that are transmitted by the HO origin frequency and the HO destination frequency in said transmission step of said mobile station.

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17. An inter-frequency HO method according to claim 16, said method comprising a measurement step wherein each of said plurality of base transceiver stations measures reception quality based on combined data obtained by said combining step of its own station, and wherein, based on this
5 reception quality, variable control is implemented over a target reception quality

that is used to control a transmission power of uplink between said mobile communication network and said mobile station.

18. An inter-frequency HO method according to claim 15, said inter-frequency HO method including a selective combining step wherein: when the HO origin base transceiver station and the HO destination base transceiver station at the time of said inter-frequency HO are different base transceiver stations, a Radio Network Controller that is connected to a plurality of base transceiver stations that make up said mobile communication network receives by way of said HO origin base transceiver station and said HO destination base transceiver station mutually identical data that are transmitted by the HO origin frequency and the HO destination frequency in said transmission step of said 5 mobile station and selectively combines said received data.

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19. An inter-frequency HO method according to claim 18, wherein uplink transmission power control is effected by increasing the transmission power of uplink between said mobile station and, of said HO origin base transceiver station and said HO destination base transceiver station, the base 5 transceiver station whose data have been selected more times in the selective combining that has been effected within a past prescribed interval in said selective combining step, and by decreasing the transmission power of uplink between said mobile station and the base transceiver station whose data have been selected fewer times.

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20. An inter-frequency HO method according to claim 15, said method including a monitoring step wherein said mobile station monitors, in said gaps, a common pilot signal that is a reference signal that is constantly transmitted by

an HO destination base transceiver station at the time of said inter-frequency
5 HO; wherein transmission of identical data in each of said transmission steps of
said mobile communication network and said mobile station begins after the
completion of monitoring of the common pilot signal in said monitor step.

21. An inter-frequency HO method according to claim 14, wherein
said reception quality is reception SIR (Signal-to-Interference Ratio), and said
target reception quality is target SIR.

22. An inter-frequency HO method according to claim 17, wherein
said reception quality is reception SIR (Signal-to-Interference Ratio), and said
target reception quality is target SIR.

23. A mobile station that includes a compressed mode, which is a
mode of intermittent communication having gaps in which communication is not
carried out in mobile communication between the mobile station and a mobile
communication network, and includes transmission means for, at a time of an
5 inter-frequency HO (Hand Over), using the gaps to transmit, to the mobile
communication network by an HO destination frequency, data that are identical
to data that are transmitted by an HO origin frequency from the mobile station to
the mobile communication network.

24. A mobile station according to claim 23, said mobile station
comprising combining means for receiving and combining mutually identical
data that are transmitted by the HO origin frequency and the HO destination
frequency from said mobile communication network using said gaps at the time
5 of said inter-frequency HO.

25. A mobile station according to claim 24, said mobile station including measurement means for measuring reception quality based on output data of said combining means, and that, based on this reception quality, implements variable control over a target reception quality that is used to control 5 a transmission power of downlink between said mobile communication network and said mobile station.

26. A mobile station according to claim 25, wherein said reception quality is the reception SIR (Signal-to-Interference Ratio); and said target reception quality is the target SIR.

27. A mobile station according to claim 24, wherein said mobile station includes a monitor means for monitoring, in said gaps, a common pilot signal that is a reference signal that is constantly transmitted by an HO destination base transceiver station at the time of said inter-frequency HO; 5 wherein transmission of identical data by said transmission means and transmission of identical data by said mobile communication network begin after completion of monitoring of the common pilot signal by said monitoring means.

28. A program for causing a computer to execute operations of a mobile station having a compressed mode, which is a mode of intermittent communication having gaps in which communication is not carried out in mobile communication between a mobile station and a mobile communication network; 5 said program comprising:
a transmission step for, at a time of a inter-frequency HO (Hand Over), using said gaps to transmit, to said mobile communication network by an

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HO destination frequency, data that are identical to data that are transmitted from said mobile station to said mobile communication network by an HO origin frequency.

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29. A program according to claim 28, said program comprising a combining step for receiving and combining mutually identical data that are transmitted by the HO origin frequency and the HO destination frequency from said mobile communication network using said gaps at the time of said inter-frequency HO.

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30. A program according to claim 29, said program comprising a measurement step for measuring reception quality based on combined data obtained by said combining step, wherein, based on this reception quality, variable control is implemented over a target reception quality that is used to control a transmission power of downlink between said mobile communication network and said mobile station.

31. A program according to claim 30, wherein said reception quality is the reception SIR (Signal-to-Interference Ratio), and said target reception quality is the target SIR.

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32. A program according to claim 29, said program including a monitoring step for monitoring in said gaps a common pilot signal that is a reference signal that is constantly transmitted by the HO destination base transceiver station at the time of said inter-frequency HO, wherein the transmission of identical data in said transmission step and the transmission of identical data by said mobile communication network begin after completion of

monitoring of the common pilot signal in said monitoring step.

33. A base transceiver station that includes a compressed mode, which is a mode of intermittent communication having gaps in which communication is not carried out in mobile communication between a mobile station and a base transceiver station; said base transceiver station comprising:

5 transmission means for, at the time of an inter-frequency HO (Hand Over), using said gaps to transmit, to said mobile station by the HO destination frequency, data that are identical to data that are transmitted from the HO origin base transceiver station to the mobile station by the HO origin frequency.

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34. A base transceiver station according to claim 33, said base transceiver station comprising combining means for, when the base transceiver station is both the HO destination base transceiver station and the HO origin base transceiver station at the time of said inter-frequency HO, receiving and

5 combining mutually identical data that are transmitted by the HO origin frequency and the HO destination frequency from said mobile station using said gaps at the time of said inter-frequency HO.

35. A base transceiver station according to claim 34, said base transceiver station comprising measurement means for measuring reception quality based on output data of said combining means and, based on this reception quality, implementing variable control over a target reception quality

5 that is used to control the transmission power of the uplink between its own station and said mobile station.

36. A base transceiver station according to claim 35, wherein said reception quality is the reception SIR (Signal-to-Interference Ratio), and said target reception quality is the target SIR.

37. A base transceiver station according to claim 34, said base transceiver station comprising means for constantly transmitting a common pilot signal, which is a reference signal, wherein said mobile station monitors this common pilot signal in said gaps, and the transmission of identical data by said 5 transmission means and the transmission of identical data by said mobile station begin after the completion of monitoring of the common pilot signal by said mobile station.

38. A program for causing a computer to execute operations of a base transceiver station that includes a compressed mode, which is a mode of intermittent communication having gaps in which communication is not carried out in mobile communication between a mobile station and a base transceiver 5 station, said program comprising:

10 a transmission step for, at the time of an inter-frequency HO (Hand Over), using said gaps to transmit, to said mobile station by the HO destination frequency, data that are identical to data that are transmitted from said HO origin base transceiver station to said mobile station by the HO origin frequency.

39. A program according to claim 38, said program comprising a combining step for, when a base transceiver station is both the HO destination base transceiver station and the HO origin base transceiver station at the time of said inter-frequency HO, receiving and combining mutually identical data that

5 are transmitted by the HO origin frequency and the HO destination frequency from said mobile station using said gaps at the time of said inter-frequency HO.

40. A program according to claim 39, said program comprising a measurement step for measuring reception quality based on combined data obtained by said combining step, wherein, based on this reception quality, variable control is implemented over the target reception quality that is used to 5 control the transmission power of the uplink between its own station and said mobile station.

41. A program according to claim 40, wherein said reception quality is reception SIR (Signal-to-Interference Ratio), and said target reception quality is the target SIR.

42. A program according to claim 39, said program comprising a step for constantly transmitting a common pilot signal that is a reference signal, wherein said mobile station monitors this common pilot signal in said gaps, and the transmission of identical data in said transmission step and the transmission 5 of identical data by said mobile station begin after completion of monitoring of the common pilot signal by said mobile station.

43. A radio network controller in a mobile communication system that includes a compressed mode, which is a mode of intermittent communication having gaps in which communication is not carried out in mobile communication between a mobile station and a mobile communication network, said radio 5 network controller comprising:

a selective combining means for, at the time of an inter-frequency HO

(Hand Over), receiving mutually identical data that are transmitted from the mobile station by the HO origin frequency by way of the HO origin base transceiver station and by the HO destination frequency by way of the HO destination base transceiver station by using gaps and then selectively combining the data.

10 44. A radio network controller according to claim 43, wherein uplink transmission power control is effected by increasing the transmission power of the uplink between said mobile station and, of said HO origin base transceiver station and said HO destination base transceiver station, the base transceiver 5 station whose data have been selected more times in the selective combining that has been effected by said selective combining means within a past prescribed interval, and decreasing the transmission power of the uplink between said mobile station and the base transceiver station whose data have been selected fewer times.

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45. A radio network controller according to claim 43, wherein said mobile station monitors, in said gaps, a common pilot signal that is a reference signal that is constantly transmitted by said HO destination base transceiver station, and wherein transmission of identical data by said mobile station begins 5 after completion of monitoring of the common pilot signal by said mobile station.

46. A radio network controller according to claim 44, wherein said mobile station monitors, in said gaps, a common pilot signal that is a reference signal that is constantly transmitted by said HO destination base transceiver station, and wherein transmission of identical data by said mobile station begins 5 after completion of monitoring of the common pilot signal by said mobile station.

47. A program for causing a computer to execute operations of a radio network controller in a mobile communication system that includes a compressed mode, which is a mode of intermittent communication having gaps in which communication is not carried out in mobile communication between a 5 mobile station and a mobile communication network, said program comprising:
a selective combining step for, at the time of an inter-frequency HO (Hand Over), receiving mutually identical data that are transmitted by using said gaps from said mobile station by the HO origin frequency by way of HO origin base transceiver station and by the HO destination 10 frequency by way of the HO destination base transceiver station and selectively combining the data.

48. A program according to claim 47, wherein uplink transmission power control is effected by increasing the transmission power of the uplink between said mobile station and, of said HO origin base transceiver station and said HO destination base transceiver station, the base transceiver station 5 whose data have been selected more times in the selective combining that has been effected by said selective combining means within a past prescribed interval, and decreasing the transmission power of the uplink between said mobile station and the base transceiver station whose data have been selected fewer times.

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49. A program according to claim 47, wherein said mobile station monitors, in said gaps, a common pilot signal that is a reference signal that is constantly transmitted by said HO destination base transceiver station, and wherein transmission of identical data by said mobile station begins after

5 completion of monitoring of the common pilot signal by said mobile station.

50. A program according to claim 48, wherein said mobile station monitors, in said gaps, a common pilot signal that is a reference signal that is constantly transmitted by said HO destination base transceiver station, and wherein transmission of identical data by said mobile station begins after the

5 completion of monitoring of the common pilot signal by said mobile station.